

REMARKS

In the Office Action, the Examiner noted that claims 1-18 are pending in the application and the Examiner has rejected all claims. The Examiner's rejections are traversed below.

The Prior Office Action and Response

In the Amendment filed in response to the prior Office Action, the Applicants made the following arguments for patentability:

1. The claimed polarization control section does not correspond to the polarized-wave identifying/synthesizing unit 3 of Kosaka because the unit 3 is not provided with the function of making specific polarization states variable. To the contrary, the unit 3 of Kosaka et al. fixes the signal lights to a specific polarization state.

2. The controller 10 in Kosaka, which the Examiner alleges to correspond to the claimed control section, does not control unit 3 (which the Examiner alleges to correspond to the claimed polarization control section) as recited in claim 1.

3. It was urged that Kosaka et al. does not teach or suggest the claimed monitoring section that monitors a polarization mode dispersion generation state of the signal light output from the polarization mode dispersion generation section.

The Examiner's Response in the Current Office Action

In the current Office Action, the Examiner has responded to the prior arguments by issuing a new rejection of the claims based on Kosaka et al. in view of the newly cited Shimizu reference (U.S. Patent 4,898,441).

Specifically, in items 2-11 on pages 2-7 of the Office Action, the Examiner has rejected claims 1-4, 9, 12-14 and 18 under 35 U.S.C. § 103 as obvious over the previously cited Kosaka et al. reference in view of newly cited U.S. Patent 4,898,441 to Shimizu. In addition, dependent claims 5-8, 10-11 and 15-17 are rejected in items 12 and 13 on pages 8 and 9 of the Office Action as unpatentable over Kosaka in view of Shimizu in combination with either U.S. Patent 6,301,273 to Sanders et al. or U.S. Patent Application No. 10/854,347 to Hwang et al.

On page 3 of the Office Action, the Examiner admits that Kosaka et al. fails to disclose "a polarization control section that controls a polarization plane angle of input signal light to produce variable polarization states." However, the Examiner takes the position that this feature is taught by column 2, lines 39-45 of Shimizu which state:

Accordingly, it is an object of the invention to provide a polarization controller in which there is no limitation in an operating range for the control of an input light polarization.

It is a further object of the invention to provide a polarization controller in which any fluctuation of an input light polarization can be controlled.

Claims 1 and 18 Patentably Distinguish Over the Prior Art

Claim 1 recites "a polarization control section that controls a polarization plane angle of input signal light to produce variable polarization states." Applicants do not see how this claim feature is taught by the above-quoted portion of Shimizu or any other portion of the disclosure of Shimizu's polarization controller.

It is also submitted that the Examiner's line of reasoning with respect to obviousness is flawed. On page 3 of the Office Action, the Examiner states:

Therefore, it would have been obvious to one skilled in art (e.g. an optical engineer) at the time the invention was made, to replace the polarizers 12a and 12b of Kosaka with the polarization controller of Shimizu, for the advantage of controlling polarization without the loss of photons due to the use of a polarization filter.

Shimizu discloses a polarization controller which is capable of polarization-controlling any fluctuation of an input light polarization while avoiding any limitation on an operating range for the control of the polarization due to a limit of driving voltages. The function of the polarization controller of Shimizu differs from that of the polarizers 12a and 12b described in Figures 3 and 4 of Kosaka et al., in that the polarization controller can variably control the polarization state of the inputted signal light. As indicated above, on page 3 of the Office Action, the Examiner has taken the position that it would have been obvious to one skilled in the art to replace the polarizers 12a and 12b of Kosaka et al. with the polarization controller of Shimizu.

The Applicants submit that Kosaka et al. describes an arrangement having a configuration in which the polarization planes of two signal lights passing through the polarizers 12a and 12b, are mutually orthogonal. (See column 10, lines 4-7 and 28-39.) Although Kosaka et al. describes that the signal light inputted with any polarization mode is secured to a specific polarization state, and then outputted to a polarization maintaining optical amplifying medium 4, Kosaka et al. does not include any disclosure concerning compensation for the polarization

mode dispersion performed by varying the specific polarization state as in the present claimed invention. Further, Shimizu does not teach or suggest the claimed polarization mode dispersion compensation of claim 1. Thus, it is submitted that one of ordinary skill would not have been led to achieve compensation of polarization mode dispersion through replacement of the polarizers 12a and 12b of Kosaka et al. with the polarization controller of Shimizu. This analysis also supports Applicants' prior argument 3 that the polarization state of the output signal light is not monitored at the detection unit 9 and the polarized wave identifying/synthesizing unit 3 is not controlled by the controller 10.

With respect to argument 2 presented in the prior Amendment, the Examiner maintains the position that the claimed control section that controls the polarization control section corresponds to controller 10 of Kosaka et al. However, the Examiner's comments are still silent regarding Applicants' prior argument that the controller 10 of Kosaka et al. does not control the polarized-wave identifying/synthesizing unit 3 of Kosaka (which includes polarizers 12a and 12b in unit 3 of Kosaka).

With respect to argument 3 above relating to the claimed monitoring section, the Examiner takes the position on page 2 of the Office Action that this feature is taught by detecting unit 9 in Fig. 2 of Kosaka. The portion of column 9 relied on by the Examiner states:

Some of the lights split by the branching unit 8 are supplied to the detection unit 9 for monitoring the split lights. The split lights are then supplied to the controller 10 for controlling the exciting unit 6 so as to adjust the amplified signal lights to predetermined values.

Applicants submit that this disclosure does not teach the features of the monitoring section which are stated to monitor "a polarization mode dispersion generation state of the signal light output from said polarization mode dispersion generation section." Therefore, Applicants maintain that Kosaka et al. does not teach or suggest the claimed control section which "controls said polarization control section so that polarization mode dispersion monitored in said monitoring section, is reduced."

In the present claimed invention as set forth in claim 1, the polarization states of the input signal lights are variably controlled by the polarization control section and therefore the differential group delay given between orthogonal polarization mode components of the signal light by the polarization mode dispersion generation section can be made optimum. As a result, the polarization mode dispersion compensation of the signal lights is performed. This kind of

polarization mode dispersion compensation function cannot be exhibited by the cited art. In particular, it is submitted that the cited art does not teach or suggest:

- a polarization control section that controls a polarization plane angle of input signal light to produce variable polarization states; . . .
- a monitoring section that monitors a polarization mode dispersion generation state of the signal light output from said polarization mode dispersion generation section; and
- a control section that controls said polarization control section so that polarization mode dispersion monitored in said monitoring section, is reduced.

In view of the above, it is submitted that claim 1 patentably distinguishes over the prior art.

Claim 18 is directed to an optical amplifier which includes:

- a polarization control section that controls a polarization plane angle of input signal light to produce variable polarization states;
- a polarization mode dispersion generation section having an optical transmission medium with a rare earth element;
- a pumping light supply section that applies pumping light to the optical transmission medium;
- a monitoring section that monitors a polarization mode dispersion generation state of the signal light output from said polarization mode dispersion generation section; and
- a control section that controls said polarization control section, so that polarization mode dispersion monitored in said monitoring section, is reduced.

Therefore, it is submitted that claim 18 patentably distinguishes over the prior art.

Claims 2-4, 9 and 12-14

Claims 2-4, 9 and 12-14 depend directly or indirectly, from claim 1 and include all the features of that claim plus additional features which are taught or suggested by the prior art. Therefore, it is submitted that claims 2-4, 9 and 12-14 patentably distinguish over the prior art.

Claims 5-8, 10-11 and 15-17

On pages 8 and 9 of the Office Action, the Examiner rejected claims 5-8, 10-11 and 15-17 under 35 U.S.C. § 103 as unpatentable over various combinations of Kosaka et al., Shimizu and U.S. Patent No. 6,301,273 to Sanders et al. and U.S. Patent Application No. 10/854,347 to Hwang et al.

Claims 5-8, 10-11 and 15-17 depend, directly or indirectly, from claim 1 and include all the features of that claim plus additional features which are not taught or suggested by the prior art. Further, it is submitted that neither Sanders nor Hwang et al. cure the deficiencies of Kosaka et al. and Shimizu. Therefore, it is submitted that claims 5-8, 10-11 and 15-17 patentably distinguish over the prior art.

Summary

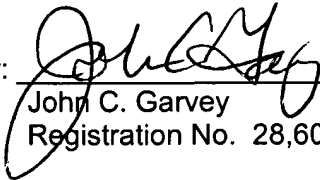
It is submitted that none of the references, either taken along or in combination, teach the present claimed invention. Thus, claims 1-18 are deemed to be in a condition suitable for allowance. Reconsideration of the claims and an early notice of allowance are earnestly solicited.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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